

Amendment to the Title:

Please change the title of the invention to NODE DEVICE AND OPTICAL PATH SETTING METHOD.

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

18. (Currently Amended) A node device which is used in an optical network system, the node device for transferring a user packet input from outside said optical network system to outside said optical network system through a plurality of said node devices, which are provided for making an optical path on a transfer route and which functioning as a start point node device, and an end point node device, an intermediate point node having an optical path to be set in said optical network system device between the start and end point node devices, respectively, the node device comprising:

~~— a connection information responding means for inquiring a second node device adjacent to a self node device about connection information of said second node device and connection information of a third node device adjacent to said second node device each time a predetermined time is elapsed or a predetermined event is generated, responding with the connection information of the self node device and the connection information of a fourth node device adjacent to the self node device if the self node device receives inquiry about connection information of the self node device from the~~

second node device, and storing the connection information of said second node device and the connection information of said third node device acquired from said second node device; and

an optical path setting means for setting an optical path which cuts through a higher layer of said self node device based on the connection information of each node device acquired using said connection information responding means when said node device functions as said intermediate node

a router,

an optical switch, and

a node control device, said node control device including a connection information responding means, and an optical path setting means;

said connection information responding means, when said optical network system has sequentially provided therein a first node device, a second node device, a third node device, and a fourth node device and when said connection information responding means belongs to said second node device:

inquiring said third node device adjacent to said second node device about connection information of said third node device and connection information of said fourth node device adjacent to said third node device each time a predetermined time is elapsed or a predetermined event is generated, and storing the connection information of said third node device and the connection information of said fourth node device; and

responding with connection information of said second node device and connection information of said first node device adjacent to said second node device if said second node device receives inquiring about the connection information thereof and the connection information of said first node device; and

said optical path, when said second node device functions as said intermediate node device, setting an optical path in said second node device without going through the router included therein based on the connection information of each of said third and fourth node devices acquired using said connection information responding means.

19. (Currently Amended) The node device according to Claim 18, further comprising:

~~a cut-through an optical path determination means for determining the necessity of a cut-through in said optical path setting means of any one of the second, third, or fourth node devices which function as said intermediate node based on the connection information of each one of said node devices, stored by said connection information responding means of said node device when said device functions as said start point node, and instructing the setting of said cut-through optical path to any one of said second, third, or fourth node devices for which said cut-through is determined as necessary;~~

said optical path determination means, when said second node device functions as said start point node device and when said first, third, and fourth node devices function as said intermediate node devices, respectively:

determining the necessity of the setting of an optical path which does not go through the router belonging to any one of said first, third, and fourth node devices based on the connection information of each of said first, third, and fourth node devices, stored by said connection information responding means of said second node device, and
instructing the setting of said optical path to any one of said intermediate node devices which correspond to said first, third, and fourth node devices, respectively, and for which the setting of said optical path is determined as necessary.

20. (Currently Amended) The node device according to Claim 18, further comprising:

an information channel insuring means for determining whether ~~the node device~~ any one of said intermediate node devices which correspond to said first, third, and fourth node devices, respectively, and for which the setting of said ~~cut-through~~ optical path is ~~instructed~~ required, can insure the information channel even after the setting of ~~the cut-through~~ said optical path, and setting said ~~cut-through~~ optical path only when said information channel can be insured.

21. (Currently Amended) ~~A~~The node device according to Claim 18, further comprising:

~~a router for receiving a transfer packet based on header information and determining an output destination of the transfer packet;~~

~~an optical cross-connect having provided therein said optical switches for extracting optical signals from an optical fiber, inserting optical signals into an optical fiber, and setting optical paths between input/output optical fibers by one of extracting optical signals from an optical fiber, inserting optical signals into an optical fiber, and relaying optical signals from input fibers to output fibers; and~~

~~— a node control device according to claim 18 for switching a route of the optical paths using the optical switches according to instructions of the received transfer packet or based on self judgment;~~

~~said router receiving a user packet and determining an output destination of said user packet based on header information of upper layer of said user packet; and~~

~~said node control device switching a route of the optical paths using the optical switches of said optical cross-connect according to instructions of the received user packet or based on self judgment by said node control device itself.~~

22. (Currently Amended) The node device according to Claim 21, ~~further comprising a~~wherein said optical switch connecting connects a destination-based buffer to at least one output port of the router to said optical cross-connect, and for connecting a

user packet read from said destination based buffer to an input port of said optical cross-connect.

23. (Currently Amended) The node device according to ~~claim~~Claim 22, ~~further comprising wherein said router includes~~ an allowable delay recognition function means ~~at said router~~ for determining the allowable delay of a ~~transfer~~user packet for direct output of said ~~transfer~~user packet to one of the optical cross-connect and destination-based buffer according to one of the allowable delay and a packet loss ratio.

24. (Currently Amended) ~~A~~The node device according to Claim 21, further comprising:

~~a router for receiving a transfer packet based on header information of a higher layer and determining an output destination of the transfer packet;~~

~~an optical cross-connect for setting an optical path between input/output optical fibers by one of extracting optical signals from an optical fiber, inserting optical signals into an optical fiber, and relaying optical signals;~~

~~a node control device according to claim 18 for switching the direction of said optical cross-connect according to instructions of the received transfer packet or based on self judgment; and~~

an optical path extraction/insertion means provided in said optical cross-connect for an information channel ~~for one of~~alternatively extracting optical signals with a fixed

wavelength insured for ~~an~~the information channel from the optical fiber, ~~and/or for~~
inserting ~~the said~~ optical signals with a fixed wavelength into the optical fiber for
communicating information signals with another node device.

25. (Currently Amended) ~~A~~The node device according to Claim 21, further
comprising:

~~a router for receiving a transfer packet based on header information and
determining an output destination of the transfer packet;~~

~~an optical cross connect for setting an optical path between input/output optical
fibers by one of extracting optical signals from an optical fiber, inserting optical signals
into an optical fiber, and relaying optical signals;~~

~~a node control device according to claim 18 for switching the direction of said
optical cross connect according to instructions of the received transfer packet or based on
self judgment; and~~

a pilot tone signal super-imposing/receiving means for one of super-imposing
pilot tone signals for an information channel on an optical path for user data, and
separating pilot tone signals for the information channel from the optical path for
communicating information signals with another node device.

Please cancel claims 26 and 27, without prejudice.

28. (Currently Amended) An optical path setting method for an optical network system having for transferring a user packet input from outside said optical network system to outside said optical network system through a plurality of node devices, wherein each node device functions as one of which are sequentially provided for making an optical path on a transfer route and which function as a start point node device, an end point node device, an intermediate point node which locates device between said the start point node and end point node, said start point node, end point node, and intermediate node constituting said and end point node devices, respectively, each of said node devices comprising a router, an optical switch, and a node control device, and said node control device including a connection information responding means, and an optical path to be set in said optical network system setting means, the method comprising the steps of:

each one of said node devices inquiring a second node device adjacent to a self node device about the connection information of said second node device and the connection information of a third node device adjacent to said second node device each time a predetermined time is elapsed or a predetermined event is generated, and responding with the connection information of the self node device and the connection information of a fourth node device adjacent to the self node device when the self node device received said inquiry from said second node device; and

setting an optical path which cuts through the higher layer of the node device which the self node device controls, based on the connection information of each node

~~device acquired by said inquiring and responding step when the self node device functions as said intermediate node~~

~~when said optical network system has sequentially provided therein a first node device, a second node device, a third node device, and a fourth node device and when said connection information responding means belongs to said second node device,~~

~~said connection information responding means, when said node device functions as said second device,~~

~~inquiring said third node device adjacent to said second node device about connection information of said third node device and connection information of said fourth node device adjacent to said third node device each time a predetermined time is elapsed or a predetermined event is generated, and storing the connection information of said third node device and the connection information of said fourth node device, and~~

~~responding with connection information of said second node device and connection information of said first node device adjacent to said second node device if said second of node device receives inquiring about the connection information thereof and the connection information of said first node device; and~~

~~said optical path setting, when said second node device functions as said intermediate node device, setting an optical path in said second node device without going through the router included therein based on the connection information of each of~~

said third and fourth node devices acquired using said connection information responding means.

29. The optical path setting method according to ~~claim~~Claim 28, further wherein said node control device further comprises an information channel insuring means, the method comprising the steps of:

said information channel insuring means:

determining whether ~~the node device~~any one of said intermediate node devices which correspond to said first, third and fourth node devices, respectively and for which the setting of the ~~cut-through~~ optical path is ~~instructed~~requested can insure the information channel even after the setting of the ~~cut-through~~ optical path, and

setting said ~~cut-through~~ optical path only when said information channel can be insured.

30. (Currently Amended) The optical path setting method according to ~~claim~~Claim 28, further comprising steps of:

reading a packet from the destination-based buffer provided between said router and said optical switch; and

transmitting the packet to the ~~cut-through~~ optical path after setting.

31.(Currentl y Amended) The optical path setting method according to ~~elaim~~Claim 30, further comprising the step of:

storing the packets in said destination-based buffer based on one of an allowable delay time and a packet loss ratio.

32. (Currently Amended) The optical path setting method according to ~~elaim~~Claim 28, further comprising the steps of:

communicating between the node devices where the ~~cut-through~~ optical path is set; and

using optical signals with a wavelength insured for an information channel after said ~~cut-through~~ optical path is set.

33. (Currently Amended) The optical path setting method according to ~~elaim~~Claim 2832, further comprising the steps of:

communicating between the node devices where the ~~cut-through~~ optical path is set; and

super-imposing pilot tone signals for an information channel on the optical path for user data even if said ~~cut-through~~ optical path is set.

Please cancel claim 34, without prejudice.

35. (New) A node device in an optical network system including a first node device, a second node device connected thereto through an optical fiber, and a third node device connected thereto through an optical fiber, said second node device transferring a user packet input from outside said optical network system to said third node device through said second node device, the node device functioning as said second node device comprising:

a router, an optical switch, and a node control device;

said node control device including a connection information responding means, and an optical path setting means,

said connection information responding means inquiring said third node device adjacent to said second node device about connection information of said third node device and connection information of another node device adjacent to said third node device each time a predetermined time is elapsed or a predetermined event is generated, and storing the connection information of said third node device and the connection information of said another node device as a network connection information; and

said optical path setting an optical path from said first node device to said third node device through said second node device without going through the router included therein based on said network connection information acquired using said connection information responding means.